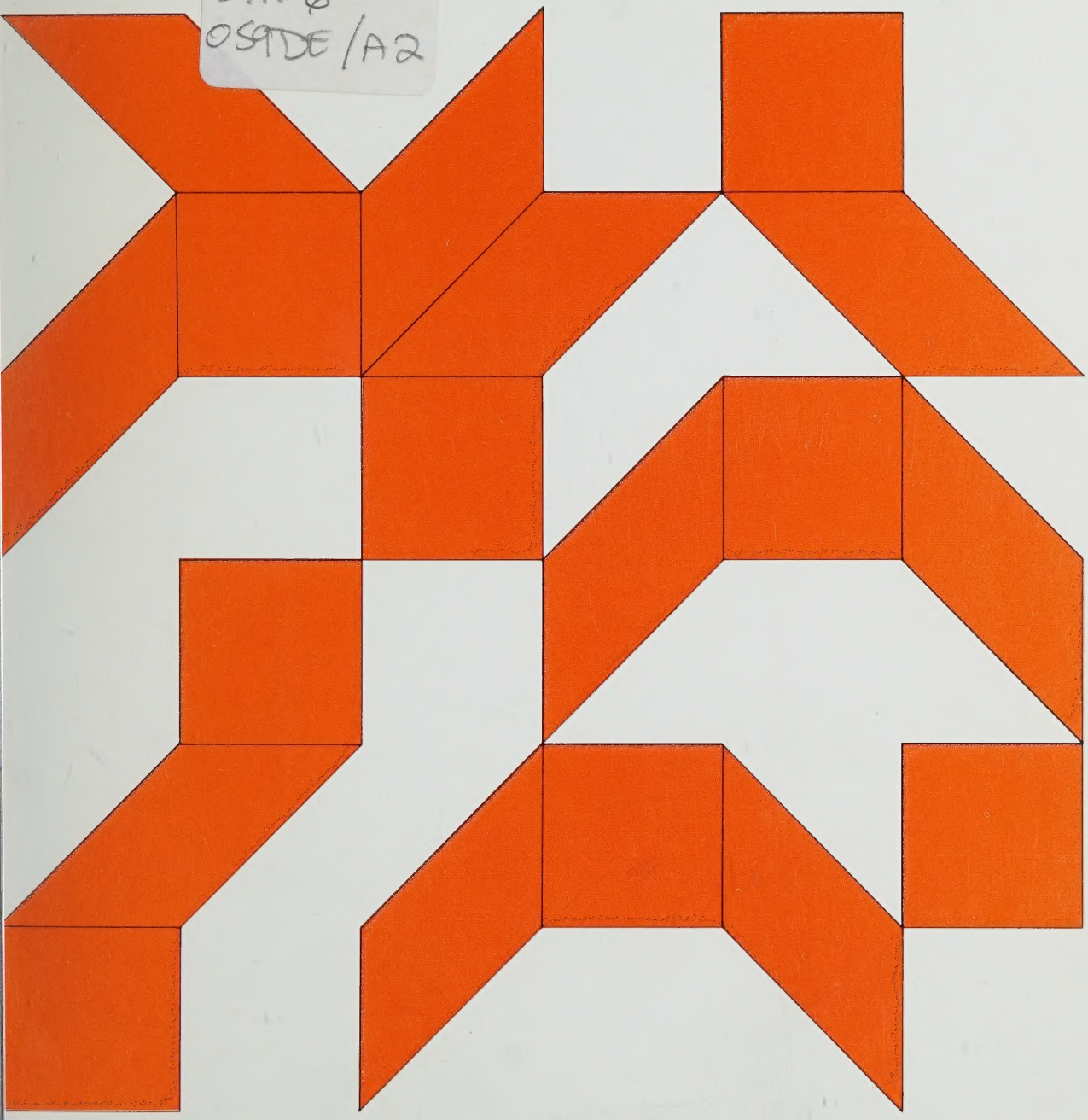
An account of a series of workshops sponsored by
the Division of School Planning and Building Research
Ontario Department of Education

School Design Forum

OHUC
371.6
OS9DE/A2

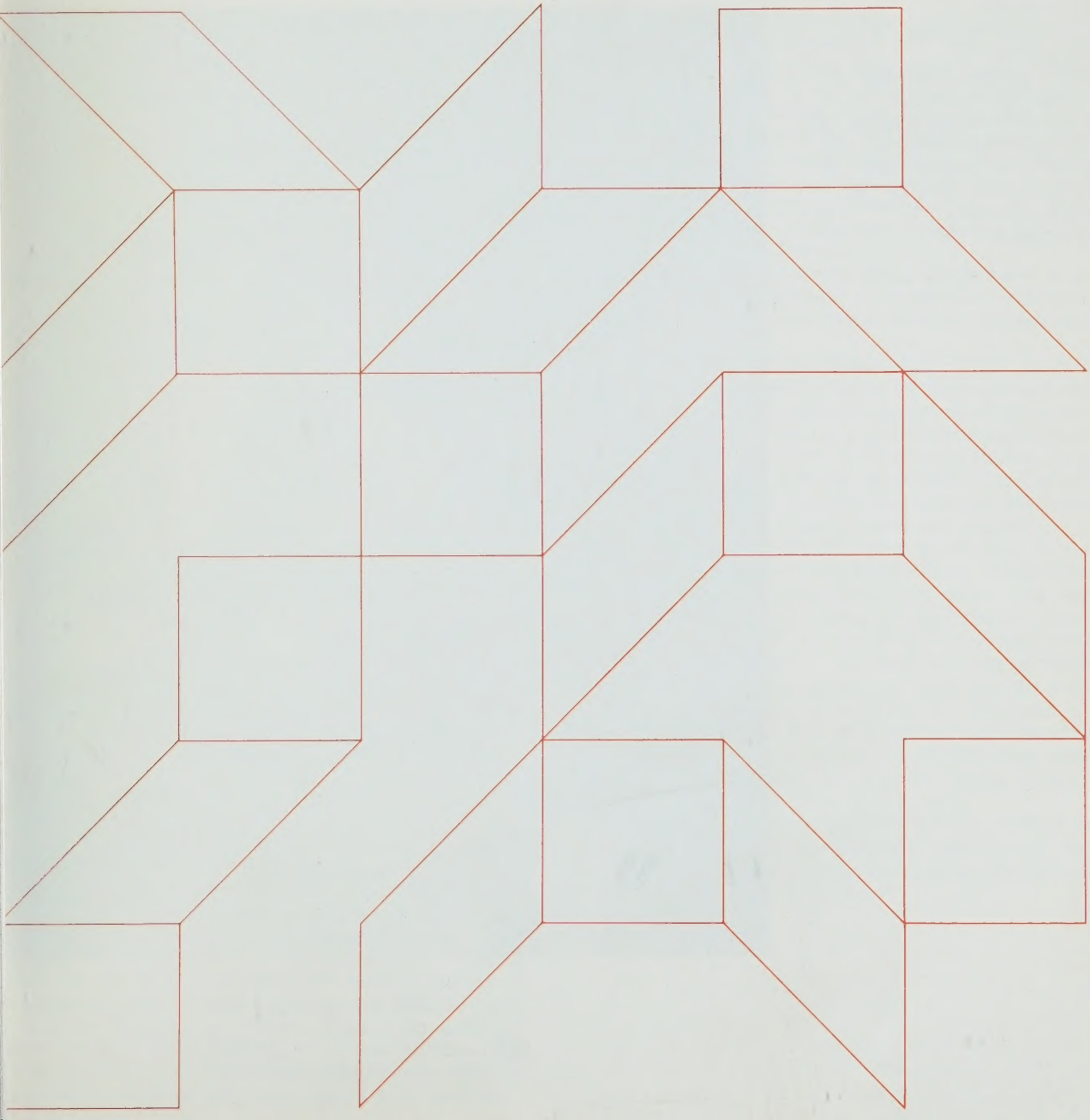


Digitized by the Internet Archive
in 2025 with funding from
University of Toronto

https://archive.org/details/schooldesignforu00onta

An account of a series of workshops sponsored by
the Division of School Planning and Building Research
Ontario Department of Education

School Design Forum



Contents

Introduction 1
The Building Team 3
Financing 4
Basic Design Problems 5
Influences on Design 7
Facilities and Equipment 10
General Requirements 13
Control of Environment 14
Construction Quality 16
Looking Ahead 17
Conclusion 18

A new forum for discussion of school design has been in effect in Ontario since 1964 in the form of School Design Workshops. Under the sponsorship of the Division of School Planning and Building Research of the Ontario Department of Education, these workshops have brought together school board members and officials, municipal representatives, teachers, architects, engineers, builders, officials of the Department and many others to discuss problems of design and new ways to provide economically for the rapidly expanding educational needs of Ontario.

The formation of workshops was one of a series of steps taken by the Department in its efforts to cope with the crucial demands of its field of responsibility. In 1944, for example, the Department inaugurated a scheme of grant support for school construction. As a result, the Technical Advisers Office was established to deal with building problems created by the sudden wartime rise in the birth rate. This unit, now called the School Plant Approvals Office, receives proposals for new, additional and renovated projects, and processes them for grant purposes.

In 1963 a Minister's Conference on School Design, which led to the establishment of the Division of School Planning and Building Research, was held in Toronto. Although the Division is now responsible for other areas relating to the Department's building program, its four primary objectives were:

a) To investigate the facilities necessary to house new teaching aids and teaching techniques

b) To study quality control of school buildings with specific reference to materials and construction methods as related to costs

c) To avoid early obsolescence of school buildings

d) To see if greater use can be made of schools for community purposes.

Shortly after the formation of the Division, a series of regional workshops was set up to study the problems of school design. The first five workshops were held in Sudbury, the Lakehead, Windsor, Kingston and Niagara Falls. The topics discussed included: local building needs, problems of the professional building team, the meaning of construction quality, control of environment, the effect of teaching aids, and the function of the building committee. Among the speakers were members of the building profession and the educational system, and addresses were followed by discussions to which all were encouraged to contribute.

The suggestions of the 650-odd participants were received with lively discussion and enthusiasm. Although the Department and experts in various fields were not at all times in agreement with suggestions, some of the more useful ideas have already been adopted by the Department or have been incorporated in publications. Publications released so far are *Guidance Units and Physical Education Facilities for Secondary Schools, Library Materials Centres and Business and Commerce Facilities for Secondary Schools,* and *Rehabilitation of Schools.*

Other publications are now being prepared on such special areas as classrooms for emotionally disturbed children, vocational workshops, science, physics and biology laboratories.

The Workshops and the above publications are part of an attempt to provide better communications between members of the schools system and the professional building team and to consolidate mutual problems in an effort to reach satisfactory solutions. One member, in pointing out the great difficulties which school designers face, quoted anthropologist Margaret Meade's evaluation of our present-day dilemma.

'Because of the fantastic rates of change in the world in which we live,' said Miss Meade, 'children of five have already incorporated into their everyday thinking, ideas that their elders will never fully assimilate. Within the lifetime of the ten-year-olds the world has entered a new age . . . Teachers who never heard a radio until they were grown up have to cope with children who never knew a world without television . . . The children whom we bear and rear and teach are not only unknown to us and unlike any children that have been in the world before, but also the degree of their unlikeness itself alters from year to year.'

As an attempt to consolidate some of the workshop recommendations into a meaningful pattern, the following is a summary of statements made by participants in the first five workshops.

Important in the quest for the best possible schools at the best possible price is the co-operation of members of school boards, architects, engineers, school administrators and teachers at all stages of the planning of each school project.

The initial impetus derives from the school board and its trustees. They must be aware of new developments and must establish policy regarding financial arrangements. But most important, these administrators must know how to seek out and engage the best available professional help – architects, engineers, designers, etc.

1. *Makeup of the Team*

The three key men of the professional building team are the architect, consulting engineer and contractor.

Apart from the architect's creative contribution, he plays the role of adviser, planner, designer, coordinator, production man, administrator and consultant.

For best results and economy of planning, the architect should be appointed as soon as the project is conceived.

It is the responsibility of educators, architects and engineers to use their skills in creating an environment for learning.

There are many types of consulting engineers, including electrical, mechanical and structural, any of whom may be retained by the architect in a typical school building project.

If there is to be an engineer he should be engaged before the design and detailing aspects of the work begin. This will make possible properly conducted feasibility studies and cost surveys in order to determine whether a scheme is practical and, if so, the most economical way of achieving it.

To ensure realistic and fair bidding for the project, a system of pre-qualification of the contracting firms was urged. Under this system the contractor would be encouraged to make a greater effort to meet his responsibilities.

The general contractor cannot reasonably be expected to assume responsibility for items left out of his estimate owing to an omission in drawings or specifications produced by the planning group, nor should he repair items that are in fact maintenance items. Unreasonable calls for unit prices for extras and credits place an unreasonable burden on the contractor.

School boards wish to protect themselves against faulty work and, should the need for recourse arise, it should be determined who is responsible.

2. *Problems and Suggestions for the Building Team*

It was found that one of the greatest failings of school boards was to delay adoption of a project until the last minute and then proceed to rush approvals, plans, architects, engineers and contractors to meet the September deadline.

In order to overcome this type of confusion it was suggested that the board should meet every February to study accommodation needs for September of the following year, thereby allowing at least 18 months for planning through construction stages. Better still, a period of two full years, from start of design to completion of building, is not too much time for research, design concept, detail drawings, approvals, tender calls, construction and clean-up.

A common problem of educators, architects and engineers is the necessity to design complex schools without opportunity to study the requirements and needs. One workshop resolved that the Ontario Department of Education should give greater freedom and encouragement to local school building teams to use their initiative in the formulation and carrying out of curricula, systems and building planning which could be pioneering in nature and new in concept.

Some teachers expressed a desire to be consulted about the design of the school and emphasized the need for 'human qualities' in school building.

Architects feel they have sometimes been impeded in their designs by rigid formulae, e.g., room sizes and equipment, and they would like to design for teaching methods which will lead them eventually to more freedom of design.

Contractors pointed out that occupation of a building before completion is a definite hindrance to finishing the job. If the client occupies the building before it is completed, extra costs are incurred, there are serious delays, and damage to paint, acoustic ceilings, etc.

The general contractor is then asked to repair such damages at his own expenses – a request which may be unreasonable. To avoid this problem, the completion date should be set for August 1st if possible, leaving time for delays to be absorbed.

Producing real and accurate cost estimates is difficult. It has been suggested that the architect investigate the following ideas to improve efficiency:
– Using quantity surveyors
– Establishing closer liaison with reliable contractors
– Keeping accurate records
– Delegating specific matters to others for estimating, such as mechanical, electrical or acoustical work, and furnishings.

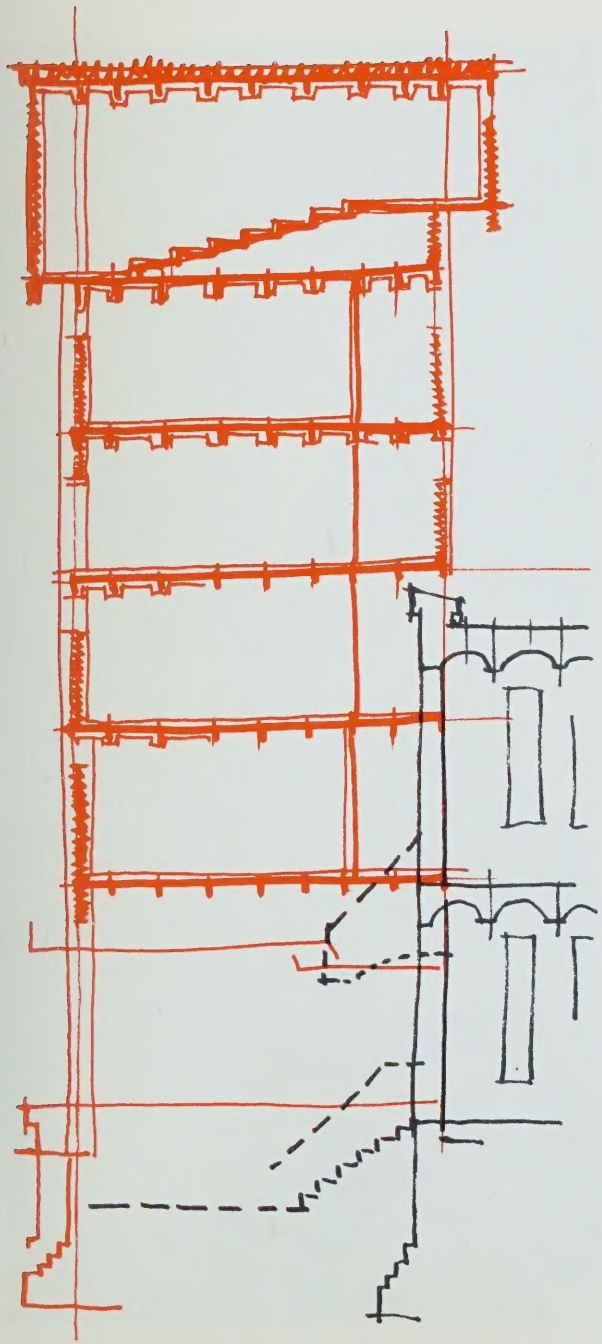
One participant of the workshops suggested that basic necessities for well-planned schools included development of proper programs for each project by designers and enlightened clients, and evaluation of flexible standards which should be kept up-to-date.

However, this continuing basic research cannot be carried out by the professional building team. It was therefore suggested that there be direct and detailed programing provided by the Ontario Department of Education to the client, that board representation on the building committee be limited to those interesed in the program and prepared to spend time on it, and that there be teacher participation and even student participation in the project.

This controversial and confusing aspect of school planning was discussed in all workshops and the following recommendations were made by the various groups:
– That the Ontario Department of Education look into the pro-rated system of grant structure, particularly with regard to an increase in grants for buildings between 35 and 50 years old;
– That the Department give serious consideration to applying grants to rehabilitate and renovate old schools because many schools, especially in urban areas, could be improved at less cost than it would take to replace them with new ones on the same site;
– That the Department establish a grant for rehabilitation and renovation of older school buildings for all areas where the population exceeds 2,500 people.
– That the Department consider a special Northern Ontario grant for schools because of higher building costs in that area;
– That the Federal Sales Tax on school construction projects and materials should be removed;
– That the Department explain the Federal and Provincial sales tax procedure to all school boards;
– That the Department give serious consideration to raising approvals for general-purpose rooms to coincide more closely with costs;
– That the Department provide more realistic unit-cost figures so that school boards can compare similar projects in different communities.

Workshop members were informed of two recent changes in the grant structures by the Department, affecting libraries and renovations.

Grants for renovations and revised grants for new lighting, heating, sanitary conveniences and structural alterations are now available. Grants for the first single gymnasium added to a school with more than 200 pupils enrolled, are also included in the grant structure.



The big problem facing educators is how to cope with the new society which developments have produced. Rapid advancement in a number of subject fields and many changes in teaching requirements have recently taken place. It is not known how many more changes we can anticipate and how great their impact will be.

1. *Renovation*

The renovation of existing schools was the centre of many discussions in the School Design Workshops. School boards must consider whether the present buildings could feasibly be renovated to cope with present-day teaching methods, or whether they are too antiquated to be worth remodelling.

Several factors governing the decision of whether or not to renovate were pointed out. These include enrolment, transportation of pupils, present design, and size of grounds. Three major checkpoints were offered:

– Educational obsolescence – Can old buildings cope with new teaching methods?

– Site obsolescence and location – Is the school accessible and the site large enough?

– Building structure obsolescence – Is the building worth renovating? If it will cost more than 70% of the cost of a new building, it may be considered obsolete.

2. *The Role of Change*

Although educators and builders now accept change as an integral part of system, it is difficult for anyone to predict what bends the educational path will take. Some clues to the future lie in the methods employed at present, but this is no guarantee that particular programs will become standard. Some of the problems outlined were as follows:

– Schools now teach art, music, physical education, home economics, industrial arts, driver education and social living, besides the academic arts subjects. Will these cultural activities lead to the setting up of cultural centres apart from the academic buildings?

– There are those in favour of subject or unit promotion rather than grade progression. How will this problem be dealt with?

– How will the buildings of the future cope with the increase in subject specialization?
– How far will schools pursue the present trend of teaching pupils to think and study independently? Will schools contain more libraries and research centres and favour traditional classrooms?
– Leisure time is increasing as a result of time-saving machines.

How do we cope with these developments?

One of the main problems brought to the fore was whether schools should be built to last for, say, 50 years, or whether we should plan for obsolescence. Those supporting the obsolescence theory felt it would be cheaper to design a school for obsolescence than for flexibility. Others felt that schools should be built to last at least 35 years as it would be unrealistic to suppose that educational requirements are going to change radically.

In the next ten years there are bound to be changes in teaching methods which would have to be reflected in basic concepts of school planning. For example, it has been pointed out that we cannot count on the continuing provision of standard classroom cells on either side of the corridor. School planning must be flexible enough so that student groups may range in size from one pupil to 100 or more.

In view of these difficulties one Workshop resolved that it would be helpful if all school boards were made more aware of the planning and advisory services available through the Department of Education's Division of School Planning and Building Research.

The key words in school planning today are flexibility, expansibility, adaptability and convertibility. The main influences seem to lie in the advanced teaching methods applied today and the audio-visual equipment available as teaching aids.

1. *Audio-Visual Aids*
Consider the basic equipment for one classroom: 16 mm film projector, opaque projector, overhead projector, filmstrip/slide projector, tape recorder, record player, radio, filmstrip previewer, etc. Because of these many helpmates a special environment must be created. For example, bad acoustics can destroy the whole purpose of this important and expensive equipment. Therefore the room should be carefully designed for listening either to sound projectors, record players, radios, or teachers. Permanent audio-visual rooms should be investigated as an alternative.

An audio-visual preparation room should be centrally located and near the library if possible, equipped with facilities for making transparencies, with printed materials, duplicating machines etc.

2. *Team Teaching*
One of the teaching methods influential on design is that of team teaching. It has been described as the attempt to group children in various settings whereby each pupil can receive assistance in a small group, then return to a larger group for other instruction.

The Nepean Township School Area No. 1 had this method of teaching in mind when they had a ten-room school designed recently. The distinct features in this school include: classrooms arranged in two clusters of five rooms each, hexagonal in shape and centered around a common room that leads through a short corridor to the central administration area; each cluster has two demountable walls to convert four classrooms into large teaching areas; the common room, large enough to accommodate 125 pupils seated on the floor, has two chalkboards and access to washroom and supply areas. The common room can also be divided into several small teaching areas, and it has a carpeted floor and acoustic ceiling; each room has a separate exit. This project has little in common with the typical school.

3. *Educational Television*
The 1966-67 school season introduced another influence with much potential in the years to come: educational television, which has proved a valuable teaching aid in bringing objects, demonstrations and experiments into 'close-ups' and providing an intimacy of communication.

All schools will soon have the basic facility to pick programs 'off the air' – VHF and UHF – and, through the antenna and internal distribution system, feed the programs to the classrooms. However, when choosing equipment the main consideration is that quality is the wisest investment. It is a medium that demands attention to design and space of a highly specialized nature.

4. *Libraries*
Greater emphasis is being placed on larger and better school libraries. New courses are so designed that pupils are required to read more widely and to do individual research. It is expected that, in the near future, school libraries will remain open in the evenings for the particular use of senior pupils. With this in mind the library should be located on the main floor near an entrance.

Windows should be high or eliminated completely so that bookshelves can be placed along the outside wall. There should be workrooms for cataloguing and study nooks for senior students. Small rooms off the library should be provided for student resource areas where materials are available for preview.

5. *Language Laboratories*
With the greater emphasis on the oral aspects of language instruction there is a growing need for the language laboratory. These labs may vary from sophisticated tape-recorder/record-player combination units to the more expensive individual cubicles with a master unit at the front of the classroom, or in a control room.

6. *Vocational Training*
With the new direction taken by vocational training in the Intermediate Division, more schools will be built with commercial and shop facilities. The vocational program has attracted more pupils to courses, and it is keeping them longer in school. There is every indication that the percentage of pupils who proceed to

graduation will show a sharp increase as the reorganized program of studies progresses through the grades.

Teachers stressed the need for a 'flexible' environment for teaching. Special subjects will, of course, need special attention. Seating arrangements are often changed during classroom work and therefore allowance must be made for desks and chairs which can be arranged in different ways. There should also be accommodation for activity centres, such as a reading corner, science corner and language development area, within the classroom itself.

The two-storey school or multi-storey school was supported in some quarters because of its saving in land and space. However, here elevators should be considered to move heavy equipment from one floor to the other.

7. Community Use

While school buildings must primarily fulfil their function to educate, there is a growing interest in the use of the school and its facilities as a community centre. Community saving could be achieved if there were some way of correlating school facilities with those of wider community use. Parks, recreation, adult education and retraining, community halls, pools and libraries could easily be made available to the public and reduce duplication of facilities.

For example, the school library could serve as a branch of the main library system, or the auditorium could fulfil many community needs. One suggestion is to physically link schools with parks for maximum benefits.

School authorities should therefore ensure that their buildings are used fully over the 12-month year and are available to those seeking to up-grade their education. In a situation of this kind, schools must prepare special accommodations such as storage facilities in vocational areas, as well as separate outer entrances to cultural centres such as the library.

NO NO
RUNNING+PUSHING

'Schools should be made to fit equipment, not the equipment to fit the schools,' one speaker urged. Most school architects are aware of the need for fixtures and equipment to withstand rugged daily use by hundreds of vigorous young people. However, errors still slip by and cause annoyance and frustration to the school staff and administration. Light-switches in corridors should be key-operated and all fixtures and equipment in corridors, play areas and washrooms should be as tamper-proof as possible.

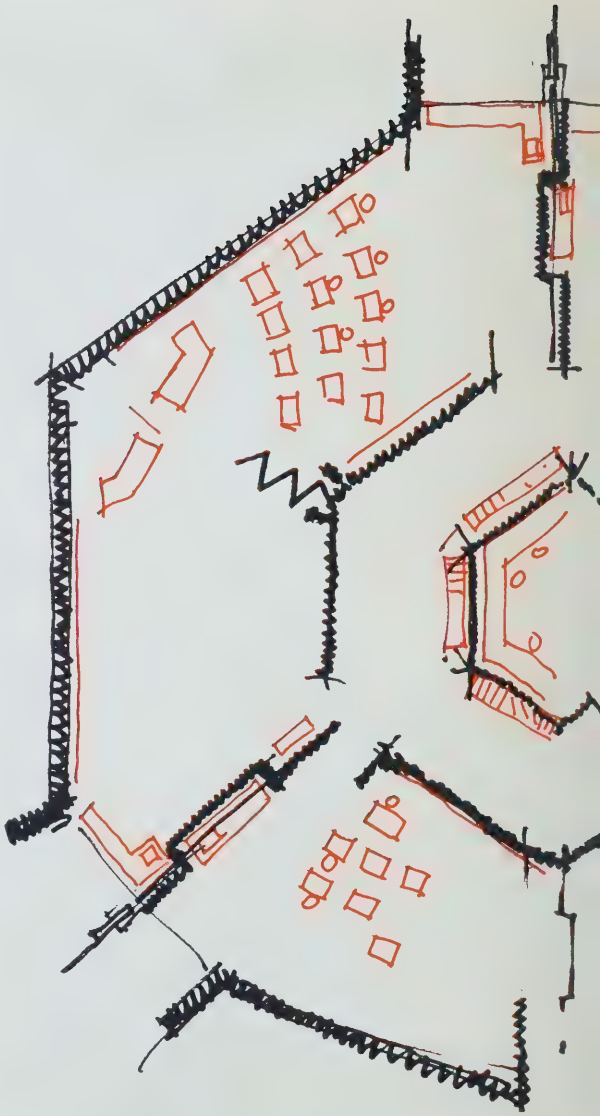
1. *General Purpose Room*
The general purpose room is used for a great many things and therefore must be equipped with a variety of facilities. A stage should be placed at one end, approximately four feet from the floor, with storage space beneath for chairs. Windows should have closing devices if they are hard to reach from the floor. If the room is to be used for large-group instruction, it should be equipped with a sink near the front desk and outlets for gas, water and electricity. In these large rooms movable walls and partitions can break up the area for team teaching.

Movable walls compare favourably in cost with concrete-block walls because they are easy and inexpensive to care for (steel base with baked-on enamel).

2. *Classrooms*
Several facilities suggested for the classroom include: a sink in every room especially primary rooms; counter space for work areas or display purposes, especially bookshelves and storage shelves of sufficient depth and surface area; filing cabinets with drawers for teachers; plenty of bulletin boards; a clock; provision for audio-visual equipment, such as hooks for screens; and when possible, doors located at the rear.

3. *Kitchens*
In schools where the library and auditorium are used by the community, a kitchen is an absolute necessity. It should be equipped with at least a double sink, electric range and refrigerator. It has also been suggested that it be placed near the staff room to make it convenient to teachers who stay at school for lunch.

4. *Libraries*
The library also demands special equipment, such as a film projector with headphones, filmstrip previewer,



tape recorder, record player with headphones, screen, storage cupboard for pictures, etc. Library use should include research for essays, general reading, visual-aid education and study.

5. *Chalkboards and Bulletin Boards*
Chalkboards and bulletin boards are important teaching aids, therefore should be well placed. Teachers like as much chalkboard space as possible. Chalkboards in front of the classroom should be higher for teachers than those on the sides for pupil use. Bookshelves with sliding doors for book storage below the front chalkboard is desirable. Sliding chalkboards give more space for other purposes. Chalkboards which slide vertically provide both a chalkboard and a corkboard for the teacher. Another type of chalkboard with a steel backing makes possible the use of magnetic aids. Chalkboards at the front of the room seem to provide better visibility when the bottom edge is brought forward slightly to a slanted position.

The teacher needs extensive bulletin board space for displays of pupils' work, maps, charts, diagrams and other visual teaching material. Bulletin boards are best placed at eye level.

6. *Storage*
Storage of books, equipment and clothing is important in order to save space and promote neatness. In most cases, clothing storage is provided at the back of the classroom. It is felt that these clothing areas should be enclosed. Two doors, opening outward, seems a desirable feature and a fan to take out odours from wet clothing and boots is recommended. A few new schools have recessed clothing-storage facilities in the hall and adjacent to the classroom. This leaves the back wall of the classroom available for teaching aids such as bulletin boards. This system seems to have been found more satisfactory in elementary schools than in senior schools.

Storage cupboards in the classroom become a necessity as teachers accumulate books and other materials. Shelves and storage space covered with arborite can be built across the back wall about 30″ high, doubling as a good work table. Shelves should be deep enough to store bristol-board sheets 22″ x 28″.

To save cost, there should be one central storage area for equipment, with one full-time clerk in charge.

7. *Electronic Equipment*
Electronic equipment demands special facilities. Educational television needs conduits for coaxial cables which should be installed while schools are being built. Videocorders will overcome the problem of scheduling for television broadcasts in secondary schools. A school should have an area where a videocorder can be located and operated with coaxial cables running to every classroom where a taped program can be received on 23-inch television sets.

Electrical outlets in most rooms should be standard 110-volt which suffices for most audio-visual equipment. However, some special requirements for 220-volt outlets will be required in rooms such as workshops.

8. *Miscellaneous*
Workshops recommended many miscellaneous items which those in attendance felt would contribute to better facilities, including:
– Grating over drains at the school entrance to catch dirt and moisture
– Soundproof folding doors between classrooms to allow for team teaching
– Facilities for drying children's mittens and boots
– One drinking fountain for every 75 children
– A custodian's room 10′ x 15′
– Terrazzo floors in halls and washrooms
– Walls in the halls glazed to a height of 4′6″
– One cement-formed drain with sides not more than one foot high for dumping scrub pails. A grease trap to prevent wax and sand from entering septic tank.
– In washrooms, one large basin for washing with foot-controlled faucets and built-in waste receptacles.

Land is the cheapest part of the investment in a new school. However, the planner should make sure he has secured the land before proceeding further.

At present, sites range from four to 30 acres. In the case of secondary schools, it was recommended that 25 acres be considered. Influencing factors are: changes in the physical education program, training for use of leisure time, mass participation of pupils' out-of-door activities, and use by the community. A school site should be chosen with professional assistance, it was generally agreed.

Within the buildings some of the essential requirements noted were as follows:

– There should be large-group instruction areas, perhaps a large room like a university theatre, holding 120 students. There are certain beneficial curricular and extra-curricular programs which could be undertaken more effectively in schools if such rooms were available. General purpose rooms should be at least 3,200 square feet in area and, depending on the school, be fitted with a stage, screen divider and audio-visual facilities.

– Gymnasiums are also considered a necessity in schools. A double gymnasium, with adequate storage room, dressing room and shower facilities, is necessary for approximately 400 pupils. Physical education programing is so well developed that it is hard to provide an acceptable program without proper gymnasium space. As enrolment passes the 1,000 mark, a third gymnasium is required.

It is important that adequate provision be made for storage of the larger items of physical education equipment – both girls' and boys' – and for dressing rooms, showers and drying rooms. Most schools now have sizable investments in football uniforms and equipment. Unless space is provided where these bulky uniforms and pads can be hung to dry properly after each use, they will soon deteriorate and need replacing. This storage space could be placed in an additional dressing room near the exit to the playing field.

– A study should be made of space requirements for staff rooms because of the rapidly growing number of teachers. Such rooms should be large, bright and comfortably furnished. As it is difficult to prepare lesson material or mark assignments in a staff-room atmosphere, study rooms smaller in size should be provided for the teacher.

– The administrative area should have a general office, large enough to provide space for one secretary for approximately every 250 students anticipated. If the school is likely to reach 1,200 or more pupils, there should be office areas for the principal and two vice-principals.

– Guidance centres are becoming a special part of our new schools. They should include a large room for displaying information materials and small rooms for counselling.

– From a design point of view, colour schemes should appeal to both teacher and child. Many attending the workshops expressed the desire to see 'beautiful' as well as practical schools. They felt that a pleasing environment with esthetic qualities would enhance the learning process.

– There should be a nurse's room, adequate for eye-testing.

1. *Classrooms*

As different subject areas require different audio-visual aids, the ideal arrangement would be to group the rooms by subjects – all the science rooms in one area, all history rooms in another, etc. This would do away with unnecessary transportation of equipment and loss of teacher time.

The square classroom appears to be most popular as pupils in the rear are nearer to the chalkboard and the teacher than in a rectangular room. Hexagonal classrooms have been suggested and some have already been built.

The ideal classroom shoud be provided with good acoustics, little window space, individual heat control, and low sound transmission.

The standard 23-foot-wide classroom seems to be too narrow for present day purposes. A more judicious design of the classroom, including the re-locating of heating elements and windows, would provide more space for book-shelves around the perimeter of the room, ample and accessible chalkboards and tackboard surfaces, and freedom to operate with projectors and other audio-visual aids.

It was resolved that the Department of Education be requested to permit construction of classrooms with 1,000 square feet of space (as compared to the present 750 feet) so that they might be divided into two rooms by a movable wall for small groups.

2. *Elementary Schools*
It is important to establish a relationship between space and child, especially in elementary schools.

More specialized rooms in elementary schools will be required: a science room; an all-purpose room containing a stage and basketball rings; and preferably, a small kitchen to be used by teachers and groups of people who use the room outside school hours. The staff room should be large enough to permit informal staff meetings.

In several central schools a hard surface area has been provided along the front of the school as a bus loading area.

3. *Secondary Schools*
The reorganized programs and the building of vocational wings have produced changes in the physical school requirements resulting in new needs.

Changes in science teaching have brought about the need for review of science-room furniture, fixtures and layout. Much greater emphasis is now placed on pupil participation in experimental work. Laboratories should be wider than the traditional 23 feet, and have an instructional section distinct from the laboratory section.

In a growing technical department, the first accommodation needed is usually an additional drafting room. Machine and auto-mechanics shops come next in demand. When adding new shops, growing interest in facilities for electronics, industrial chemistry and industrial physics should be considered. Changes recommended in this area are a better and safer means of lumber storage in carpentry shops and provision of over-head projectors in all instructional areas.

There are many problems involved in creating an educational environment, and heating, ventilation, lighting and acoustics can be either a distraction or a help to the task of the instructor.

These problems were discussed at length in many workshops and participants offered the following recommendations:

1. *Acoustics*
The noise problem originates in large expanses of glass, openable areas, hard-surfaced rooms, light fixtures, heating and ventilating systems, and classroom machinery in certain areas such as typing and business machine rooms.

To reduce the intensity of such interferences it was suggested that the classroom be built on the basis of the NCA sound curve recommended for use by both architects and engineers in areas such as music rooms and libraries. Carpeted floors were advocated. Although drapes are found to cut down on noise, they were generally found undesirable due to their high initial cost and expensive maintenance.

2. *Air Conditioning*
The control of temperature, air motion, air cleanliness odour, freshness and humidity require special attention. Senior schools appear to be developing into large complex structures with many interior rooms. Such buildings make air-conditioning a necessary feature. However, the question of having air-conditioning for all schools is still controversial as many schools are not open during the hottest months. Improved ventilation is necessary, in any case, to remove odours from wet clothing and boots. The reduction of window areas or the introduction of windowless classrooms would help curb heat-loss and over-heating, in addition to decreasing vandalism, eliminating drapes and providing more chalkboard space.

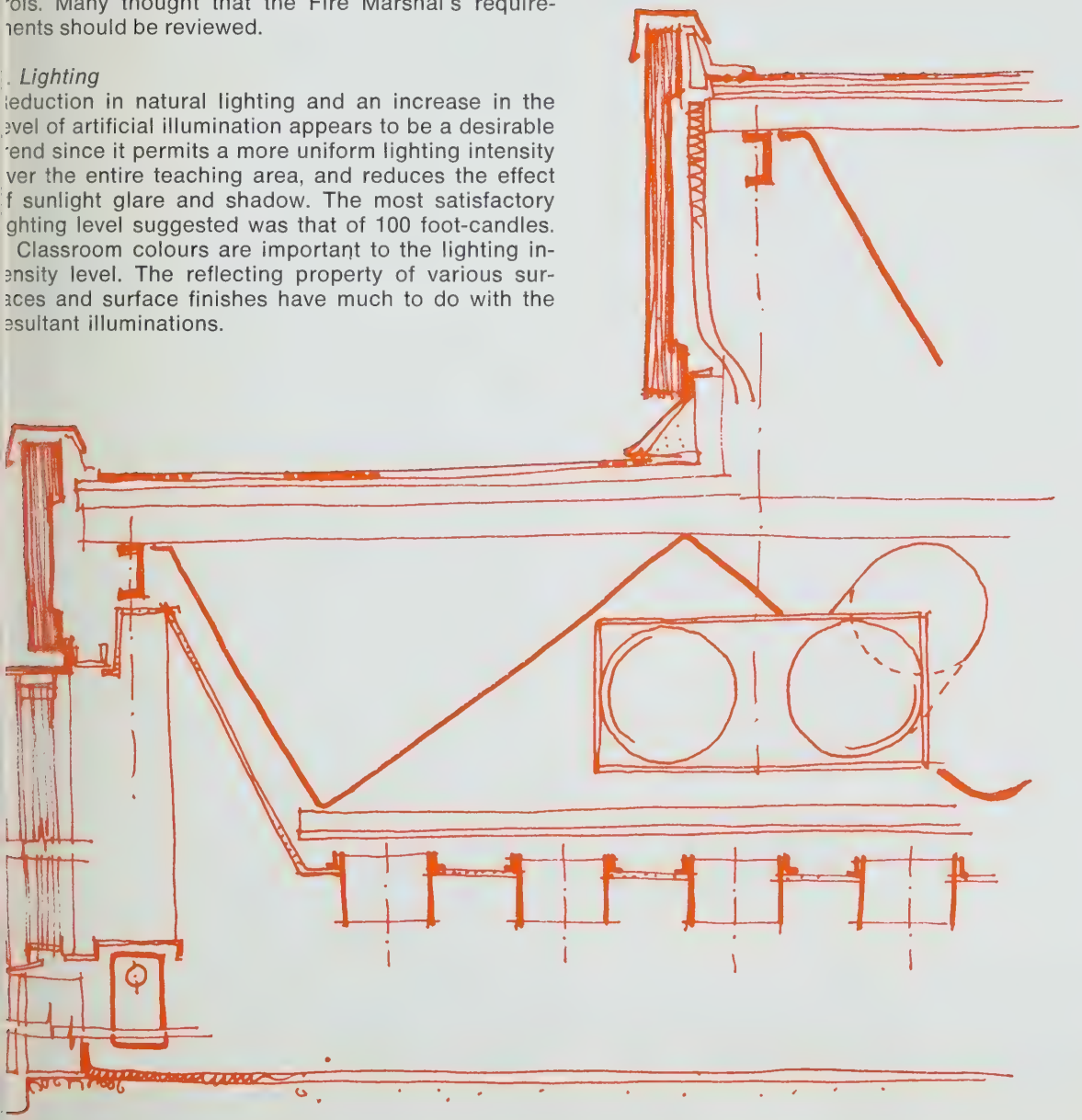
Regulatory bodies, such as the Fire Marshal, affect the design for control of environment. Certain members felt that the regulations enforced by the Fire Marshal of Ontario contribute substantially to the cost of school construction, and also to the ventilation problems in corridors. It was suggested that if the regulations were relaxed to permit limited quantities of air from standard classrooms to be exhausted through corridors, there would be a decrease in ventilation problems. It appears that with stairwells closed and no classroom

oor-grills, corridors must be separately ventilated, ıus requiring extra air-handling units and safety con-ols. Many thought that the Fire Marshal's require-ıents should be reviewed.

. Lighting

ieduction in natural lighting and an increase in the evel of artificial illumination appears to be a desirable end since it permits a more uniform lighting intensity ver the entire teaching area, and reduces the effect f sunlight glare and shadow. The most satisfactory ghting level suggested was that of 100 foot-candles.

Classroom colours are important to the lighting in-ensity level. The reflecting property of various sur-aces and surface finishes have much to do with the esultant illuminations.



The following includes a talk and resolutions made at a typical group meeting during a School Design Workshop. In this particular example the subject of construction quality was dealt with in depth and is representative of what other workshops discussed. The talk was delivered in Niagara Falls and was followed by a general discussion.

The Meaning of Construction Quality
by Stan H. Butchard, Architect, Port Colborne

The Oxford dictionary defines the word 'quality' as 'a degree or grade of excellence possessed by a thing'. Since we are concerned with construction, I believe we should eliminate from our discussion the design or functional quality of a building. We are therefore concerned with the degree of 'excellence' in the construction of the school building and the materials which form its parts.

Factors which affect the construction quality may be summarized as follows:

Indirect

1. *Site for Building*

The boards and the Department should select their sites with professional assistance, not only to satisfy the obvious requirements of ample size and location according to good community-planning practice, but also to contribute to the quality of the building.

a) Sub-grade conditions for good foundations.
b) Availability of essential services – water but non-corrosive water, storm sewers, sanitary sewers.
c) Above-surface conditions which provide for ease of surface drainage from the building without costly earth movement. Hazards of natural water courses, etc., in the building area.
d) Shape of site to provide for proper orientation – prevailing winds, heat-gain exposures, noise exposures, utilization of existing natural screens.
e) Avoiding path of industrial polluted air – high corrosion factors.

2. *Life of the Building*

How long should a school be designed to last? When is it obsolete? The Department is providing grants for school renovation for buildings 35 years and older. They appear to imply that 50 years may be the normal life of the school.

3. *Time Allowed for Design and Construction*

Most schools appear to be designed in the spring for occupation in September. Is this time enough for good design, for the careful selection of materials and for a high quality of workmanship? Shortage of time and skilled workmen may make more prefabricated components necessary.

Direct

The assessment of a construction material depends on:
– Performance according to the design requirements – e.g., flexibility, movable walls, etc.
– Performance according to approved standards – e.g., building codes, Department of Education, Fire Marshal. Are these authorities necessarily correct? They should be examined and challenged regularly.
– Life of materials.
– Ease and cost of maintenance.
– Recognition of limitations.
– Methods of assembly.
– Availability – local or Canadian manufacture. Labour problems may require alternatives.
– Appearance – colour, finish, etc.
– Multi-use – one material may satisfy requirements of structure, appearance, acoustics, etc.
– Cost – to be assessed after consideration of the above items.

How do we achieve better construction quality?

a) Allow for sufficient time for design and construction.
b) Pre-qualify contractors – approved list of contractors by the Department of Education, Architects' Association? Re-examine and set up program for study by all concerned.
c) Select the site with care and professional help.
d) Determine the life of the school.
e) Provide facilities for the training of contractors' and subtrades' superintendents, and gradation of all workmen by management and unions.
f) Set up additional agencies for the testing of new materials. Would the Department, under its Research Division, provide grants for on-site testing of finishes and materials?
g) A public relations program by all those concerned with school construction to point out that the cost of the school should be assessed in terms of its worth – qualities of design and construction according to best standards and local requirements.

'You only get what you pay for.' *(end of address)*

After discussing the subject matter, the group made the following resolutions: *That*

– sufficient time be allowed for the architect to design the building and the contractor to construct it – suggest programs ranging from 10 to 18 months depending upon the size of the project.

– the school site be selected with professional help before purchase. In addition to good community planning practice, consider sub-grade conditions, essential services, above-grade contours and drainage, shape of the site, proper orientation, prevailing winds and air pollution.

– the life of the building be determined before design.

– there be a continual check and revision of standards and codes by the authorities concerned to see that our schools are not over-built.

– facilities be provided for the training of contractors' and sub-trades' superintendents and their workmen.

– additional agencies be set up for the testing of new materials. (Ask the Department's Research Division to provide grants for and suggested methods to carry out on-site testing of new finishes and materials.)

– the Department provide unit-cost figures so that boards can compare similar projects in different communities.

– studies be carried out through the Department and the architectural association as to the feasibility and methods of pre-qualifying general contractors and sub-trades.

Students who were invited to participate in workshop discussions had imaginative and forward-looking suggestions. They foresaw high-rise or even underground schools; classrooms shaped like widges, U-shaped or windowless; ramps instead of staircases; adjustable plastic desks; contoured, padded, swivel chairs; larger lockers and a microphone on each desk.

Teachers pointed out the desirability of semi-circular classrooms with the chalkboard placed on the diameter wall, and desks which, at the push of a button, would disappear into the floor to give clear classroom areas for many uses.

Some architects believe that multi-storeyed schools are more functional, and so recommended a 'school plaza', bringing together in one general location elementary, intermediate and high school buildings to provide a flexibility of space for students of all three levels as the needs of each fluctuate from year to year.

Innovations and new developments offer great promise for the future. Continuing studies must be made to determine how the teacher's work may be made more effective, since the teacher is the key person in any educational system.

18

The School Design Workshop is a useful instrument for gauging the various opinions of the many experts in the school construction field. Within a cordial atmosphere, many ideas and suggestions were made, and these the Department of Education has assessed in research programs and carried out wherever possible.

EA 20, a new series of School Design Workshops on Education and Architecture commenced April 1967.

In this way more educators, administrators, trustees, architects, and engineers can be brought together to discuss mutual problems and become better informed about continuing improvements in the educational environment.

EA
20